Food and mechanisms of anti-mutagen

By Dr. Abbas Hussein Mugheer AL-Rubaie

Babylon University / College of Basic Education

Introduction

Substances are divided into anti-mutagenesis depending on the mechanical work into two types The first type includes the subjects that have the ability to inhibition of direct Desmutagens as working these materials to prevent materials mutagenic events that damage genetic material, through prevention or protection of the material constituents and the formation of complexes with them or with metabolites or change in the metabolic activation system, and then expelled her article out of the body where it can be said that the work of these materials is outside the cell, while the second includes the type of anti-mutagenesis substances that act inside the cell so-called bio-materials with damping Bioantimutagens. That the work of these materials have two phases In the first stage affect these materials in the system of metabolic activation Metabolic activation or inhibit materials mutagens to interact with target sites in the molecule of DNA, and this type of material is part of the first type either the second phase, which is made inside the cell, but it occurs after that the stick material mutagenic and toxic Active target and on this basis Articles inhibiting the impact the direction of change to respond more vitality of its influence toward the protection unlike materials that work within the first phase of which the impact is within the subject matter of protection The materials in the second phase works to prevent cancer progression either to push for a differentiation damaged cells or prevent their proliferation or to induce the immune system.

The Mechanisms of Antimutagenes

That the phases of the inhibitory effect of the materials for the mutations in different materials and different concentrations and time to give it.

Can serve as antioxidants in the inhibition of mutagenesis of the mutations the following verses :

First: The first mechanism: Prevention of the formation and take the mutagene outside the cell.

Of compounds in accordance with this mechanism is the Ascorbic Acid (Vitamin C), which works to prevent the formation of toxic compounds nitrogenous amino assets. Also, the phenolic compounds in tea, large capacity in this aspect .

Second: - The second mechanism: Mutagen quenching outside the cell

Where the working compound of anti-mutagenesis in accordance with this mechanism to reduce the effectiveness of chemical mutagen is a vegetable is a good example of this type of inhibitors, where it was observed that it reduces the mutagenesis effects of the compound Trp-p-2, it was observed that liquid isolated from Kale has the effectiveness of the peroxidase, which inhibits the effectiveness of this compound mutagenesis vegetable fiber also plays an important role in the inhibition through its work on or adsorption this mutagen and reduce its effectiveness. We have received DAS diallyl sulfide (which is one of the compounds found in garlic), much attention and studied its effect in much study on the impact on the effectiveness of the enzyme Cytochrome p 450 2El as this enzyme is a vital part in the metabolic activation of compounds (DNA) 1,2 DHMETHY L HYDRAZIN. Halogenated hydrocarbons Alkane, Benzene and other vehicles small molecular weight present in the environment, environmental chemical-low molecular weight has been found that giving 200 ml / kg body weight of DAS to rats, the content and effectiveness of P450 REDUCTASE in small particles of the liver Microsomes very much affected and very clearly that the effectiveness of NDMA P450 2F1 dependent demethylase decreased as well, where was less by 20% of the comparison sample after 15 hours of treatment, but gradually returned to normal after 2 days. As regards mechanical effect of DAS in the inhibition reaction P450 2F1 has said Yang and others in 1994, it is the image of the following: - The DAS metabolizes into the compound dially1 Sulfoxide and then to compound diallyl Sulfone and then the boat last metabolizes by P450 2E1 to the intermediate compounds interacting intermediates reactive or part by which will attack the heme moiety of the enzyme and thus inhibit the effectiveness of the P450 2E1 enzyme inhibition by the mechanism which known Suicide inhibition and that these compounds diallyl sulfide, diallyl

Sulfone, diallyl Sulfoxide are Competitive inhibitors of the enzyme P450 E1.

Third: - The third mechanism - Inhibiting factors or besieged inside the cell

Where it was noted that through this mechanism are antioxidants preventing mutagenesis (prevent the mutagenic or toxic materials from the interaction with the target site in the DNA molecule) or through the protection of sites where the DNA interacts with the target sites. It was found that the carcinogenic effect DMH at least add these inhibitors, including Glutathione (tripeptide), where it was noted that removes the toxic effects of these materials.

IV - the fourth mechanism: - The free radical quenching

It is this material that vitamin C is a factor remove of free radicals was found that there is an inverse relationship between the intake of fresh fruits and vegetables and the incidence of cancer, was also noted that fruit juice reduces the incidence of this disease.

V. - the fifth mechanism - inhibition by suppressor factors

Where it was noted that this material works to prevent the tumor by stimulating the differentiation of cells and compounds that work in this direction and salts Selenium and xanthophyll that remove free radicals and Retinoid working to prevent the impact of cancer cells.

VI - sixth mechanism: - the impact on system repair of DNA

Where the works of these materials to increase safety and increase the DNA of these compounds cobalt fluoride, is also working Thiol compounds to induce repair damage in the DNA or in error reduction through the inhibition of the enzyme that helps to repair many error, and cobalt chloride increases the accuracy of the reform of DNA.

The role of food in the inhibition of mutations

Containing food on a large number of elements and compounds the task that is useful in protection from surge and prevention of cancer and spread these elements and compounds significantly among a number of fruits, vegetables and other food products such as vitamin C and

betacarotenoids and Kanaxanthin stationed in juice tomatoes, cryptoxanthin stationed in the juice oranges and acid Ellagic acid found in the number of fruits, vitamin A and fiber and betacarotenoid, acid Arachidonic acid found in a number of foods.

The researchers were able to distinguish a number of vehicles of anti-mutagenesis in the extract of garlic, and these compounds ajoene and DAS with proven activities extracts of garlic in inhibited effectiveness mutagenesis IFLA toxin - B 1 - also proven effective extract of garlic in the inhibition efficiency mutagen for drug cyclophosphamide and Drug mitomycin –C- and that are used in the treatment of some cases of cancer, and garlic extracts inhibitory effect of the ability of the pesticide mutagenesis zinc phosphide.

On the other hand, the honey very effective anti-mutagenesis proved through inhibition of the ability mutagenesis for gamma ray and mitomycin –C- drug. Studies also showed that the inhibitory ability of date (Zahdi Date) on some chemical mutagens as mitomycin –C- and cyclophosphamide and also against the mutagenic effect of radiation. The compounds which found in tea have the same inhibitory ability against some chemical mutagens.